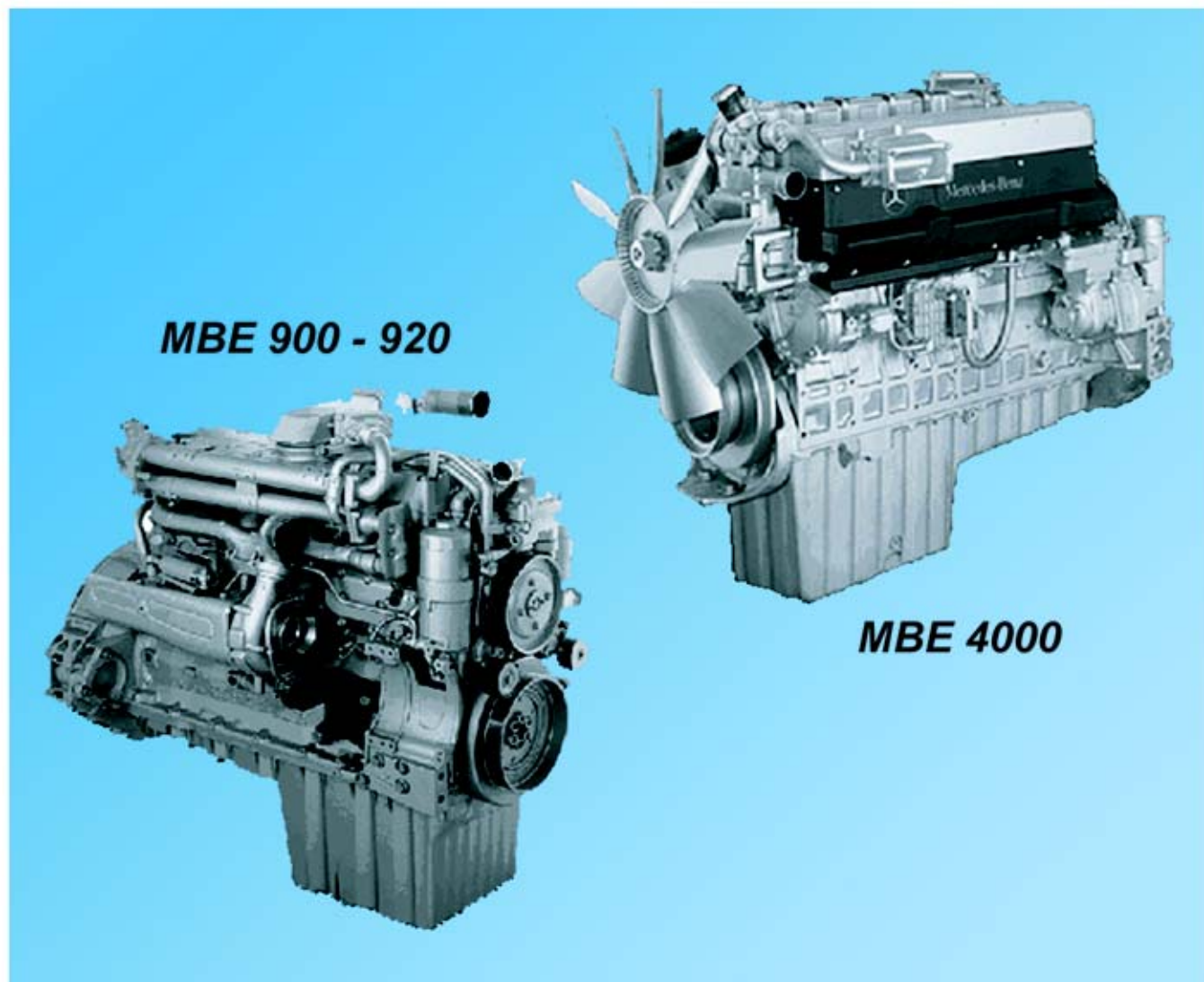


DETROIT DIESEL

MBE EGR Technician's Guide



MBE 900 - 920

MBE 4000

Components

Modes

Troubleshooting

ATTENTION

The information in this document is accurate as of **May 2005** and is subject to change without notice. This manual is to be used in conjunction with the *MBE Electronic Controls Troubleshooting Guide*, 6SE422.

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1 INTRODUCTION

The *MBE EGR Technician's Guide* was created to provide qualified service technicians with a detailed explanation of the Exhaust Gas Recirculation (EGR) system to facilitate quicker and more effective diagnosing of MBE EGR related issues.

Prerequisites for effective diagnosis include the following topics:

- Familiarity with the DDC computer software associated with DDC products
- Knowledge of both the engine and principles of vehicle operation
- Ability to perform and understand service manual and troubleshooting manual procedures
- Availability of and the training to use gages and diagnostic test equipment

The most essential tool to properly diagnose and troubleshoot an MBE EGR engine is the Detroit Diesel Diagnostic Link® (DDDL). This tool will provide all the help needed as it contains proper troubleshooting information for all products.

NOTE:

It is absolutely **critical** that you understand the EGR system to be qualified to offer any type of proper diagnostics. Do not **waste time** trying to troubleshoot a DDC product you are not qualified to troubleshoot. Your company may incur wasted labor hours. If you are qualified to perform a troubleshooting task and have spent more than one hour on that task, **STOP**, and contact the Detroit Diesel Customer Support Center at 313-592-5800. Once you have discussed your options with a technical support person, you can perform the required tests and evaluations. Please keep in contact with your technical support person. This allows you to stay on track.

1.1 VEHICLE INSPECTION

Check the following concerns prior to starting any troubleshooting:

- Ensure engine serial number on the DDEC Engine Control Unit (DDEC-ECU) matches the engine serial number.
- Walk around the vehicle and look for obvious problems such as leaks (air or liquid).
- Check the fuel filters to ensure they are secure and tight.

NOTE:

The MBE 4000 has a water separator and a fuel filter. The MBE 900 has a prefilter and main filter.

- Check for a restricted air filter.
- Inspect truck frontal area for airflow restriction through the Charge Air Cooler (CAC) and radiator.
- Ensure that the fuel tank level is at least 1/4 full.
- Look for any vehicle damage that could affect vehicle performance or fuel economy.
- Investigate any prior repairs that could affect vehicle performance.
- Check for damaged mating of the connector halves or terminals not fully seated in the connector body (backed out terminals).
- Look for improperly formed or damaged terminals. Carefully inspect all connector terminals in the suspect circuit to determine proper contact tension. Use a mating terminal to test the contact tension.
- Check for electrical system interference caused by a defective relay, DDEC-ECU driven solenoid, or a switch causing an electrical surge. Look for concerns with the charging system (alternator, etc.). In certain cases, the concern can be made to occur when the faulty component is operated as in the case of a relay.
- Verify that alternator and battery grounds are clean and making good contact.
- Wiggle wires and harnesses to try to make the concern active, or reoccur.

1.2 OPERATOR INFORMATION

This section should serve as a guideline for the technician. Talk to the operator/driver. **Be specific!**

DRIVER QUESTIONNAIRE

Ask the driver to answer the following questions before attempting to repair an intermittent concern, or a concern with symptoms but no diagnostic codes. Use their responses to these general questions as a guideline:

1. How often does the concern occur? (Can the driver operate the vehicle and demonstrate the concern to you in less than 30 minutes? If the concern is repeatable, take the vehicle for a drive with the Detroit Diesel Diagnostic Link (DDDL) connected. Start the snapshot at the beginning of the road test, use the *mark user event space* to track problems, and end the snapshot at the conclusion of the road test. Ensure you can operate the vehicle after correcting the concern without duplicating the symptoms at the operating conditions before releasing the unit to verify the concern is corrected.)
2. Has the vehicle been to other shops for the same concern? (If so, call the other shops and find out what has been done. Avoid replacing the same components again unless absolutely sure they are the source of the concern. It is unlikely the same component will fail again following a recent replacement.)
3. Did the radio, dash gages, or lights momentarily turn OFF when the concern occurred? (If other vehicle devices are affected, this indicates there may be something wrong with the ignition wiring.)
4. Does the concern occur only at specific operating conditions? (Operate the engine under similar load conditions.)
5. Does the concern occur at a specific engine operating temperature? (Operate the engine at this temperature while attempting to duplicate the concern. Use the snapshot feature on the DDDL.)
6. Does the concern occur at a specific engine operating altitude? (If possible, troubleshoot the concern at this altitude.)
7. Does the concern occur only when above or below specific outside temperatures? (If possible, troubleshoot the concern in this temperature range.)
8. Does the concern occur during other conditions, e.g. during or after rain, spray washing, or snow? (If so, thoroughly inspect the connectors for moisture entry.)
9. Did the concern occur at a specific vehicle speed? (If the problem occurs at a specific vehicle speed, check the parameters affecting vehicle speed to verify they are programmed close to the vehicle speed where the problem occurs. Check Vehicle Speed and watch the DDDL {snapshot} for changes to see if the pulse wheel [Vehicle Speed Sensor {VSS} signal] is loose.)
10. Does the concern occur at a specific engine rpm? (If the concern occurs at a specific engine rpm, unplug the oil, coolant, and air temperature sensors, and note any changes to the concern. Gather this data and contact the Detroit Diesel Customer Support Center at 313-592-5800.)

1.3 TROUBLESHOOTING TIPS

This section provides tips on troubleshooting complaints of low power, excessive oil consumption, exhaust smoke, coolant loss, and intermittent concerns. The following lists of questions are only guidelines. The service outlet need not consider every question to resolve the complaint. The questions to consider should depend upon the circumstances surrounding the vehicle symptoms.

The technician should ask the operator questions for these seven basic concerns. They are Low Power, Fuel System, Air System, Oil Consumption, Exhaust Smoke, Coolant Loss, and Intermittent Concerns.

1.3.1 LOW POWER

The basic questions to check for Low Power are:

- What caused you to suspect low power?
- When did the low power concern start?
- Are you aware of any diagnostic or performance codes?
- Are you running an unusually heavy load?
- Has the engine been serviced recently? (If yes and the concern occurred after servicing, the servicing outlet should be involved.)
- Is the air filter clean? (Verify that inlet air is not restricted.)
- Are the fuel filter and water separator clean? (A plugged filter will restrict fuel flow and result in low power.)
- How many miles are on the unit? (If mileage is high [several hundred thousand miles], valve lash may need adjusting or nozzles may need replacement.)
- Is the unit hard starting? (If there is a hard starting issue, there may be a fuel system related concern or low compression.)
- Are the vehicle fuel tanks vents are open? (Make sure the vents are open. Plugged vents will create a vacuum in the fuel tanks as fuel is consumed and result in a gradual power loss as the vehicle is operated.)
- Is there a misfire at idle or at no-load speed? (If yes, there may be a fuel or mechanical system concern.)
- Has there been a history of low power complaints? (Check warranty claim status and prior Remedy tickets.)
- Is there evidence of white, black, or blue exhaust smoke? (If yes, see smoke troubleshooting guide.)
- Is the fuel level in the fuel tank low? (If below 1/4 tank, it may result in high fuel temperature above 80 °C (176 °F). High fuel temp can also cause low power.)
- Is the exhaust flap fully open and are the exhaust system restrictions eliminated?